

STATUS OF THE DEERBERRY,  
*VACCINIUM STAMINEUM* L. (ERICACEAE),  
IN CANADA\*

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ABSTRACT

*Vaccinium stamineum* L. (deerberry) is a widespread species in the United States that reaches its northern limit in the Niagara Falls and Thousand Islands area of southern Ontario, Canada. Only five stations occur in Ontario, with the most extensive populations being found within St. Lawrence Islands National Park. Dry, open, rocky woods, with a history of fire, are the preferred habitat for this species in Canada. Whereas the largest stations are currently under government protection, their proximity to existing trails, a lack of seedling recruitment, and encroachment by later successional vegetation suggests that this species could become extirpated if the factors affecting its vulnerability are not reversed. For these reasons *V. stamineum* is recognized as a threatened species in Canada.

Key Words: *Vaccinium stamineum*, Canada, conservation status, threatened species

INTRODUCTION

*Vaccinium stamineum* L. is one of the most distinctive blueberry species found in North America. A suite of unique features, including a deeply 5-lobed, campanulate corolla and exsert stamens, distinguish this plant from all other *Vaccinium* L. spp. and have resulted in its placement in the monotypic section *Polycodium* (Raf.) Rehder. This section has no apparent affinity to Neotropical, Old World tropical or North American members of the genus (Vander Kloet, 1988).

The deerberry is a highly polymorphic species that exhibits considerable variation in the hairiness of the pedicels, hypanthium, fruit, twig glandularity, the number of flowers per inflorescence, heterophylly, plant glaucescence, and fruit color. As a result of this variability, there has been considerable debate as to the number of taxa that should be recognized. For example, Ash (1931) divided *Polycodium* into 6 sections and 21 species. On the

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other hand, Camp (1945) considered this taxon little more than a series of clines. In more modern taxonomic works, Baker (1970) maintained a single species with one additional variety (*V. stamineum* var. *sericeum* (Mohr) Ward). Ward (1974) recognized five varieties of *V. stamineum* in Florida, but conceded that when outside populations are examined, a large number of individuals are difficult to place. Finally, Vander Kloet (1988), in his monograph on the genus *Vaccinium* in North America, recognized only one species with no infraspecific taxa. I am following Vander Kloet's circumscription of *V. stamineum* for this paper.

#### DISTRIBUTION

*Vaccinium stamineum* is endemic to eastern North America where it is found from southern Ontario south to central Florida (Figure 1). This species occurs westward to eastern Texas, eastern Oklahoma, and southeastern Kansas. It appears to be absent from northern Missouri, Illinois, and northern Indiana. A few outlying populations occur in central Mexico (Figure 1). In Canada, *V. stamineum* is known from five extant stations in Ontario (Figure 1). Three stations are found in the Thousand Islands area, Leeds County; the other two occur near Niagara Falls, in the Regional Municipality of Niagara. By far the largest populations are found in the Thousand Islands (Table 1). An additional station occurs in the Thousand Islands on Wellesley Island, Jefferson County, New York, only a few kilometers from the Ontario populations (Crowder, 1982a).

The occurrence of *V. stamineum* in Canada has been known for almost 200 years. Deerberry was first collected in the Niagara region in 1798 (*Masson 15436* CAN) and in the Thousand Islands in 1876 (*Macoun 15437* CAN). Other early collections were made in 1896 at Queenston Heights (*Scott 14400* CAN), in 1891 in Stamford (now part of the city of Niagara Falls) (*Macoun 15438* CAN) and Niagara-on-the-Lake (*Dearness 1351* DAO), and in 1937 in St. David's (*Simmons s.n.* TRT).

#### HABITAT

In Ontario, *V. stamineum* occurs most frequently in dry, rocky woods with a canopy closure of approximately 40%. Plants are not usually found in open sites or in areas with deep shade. When

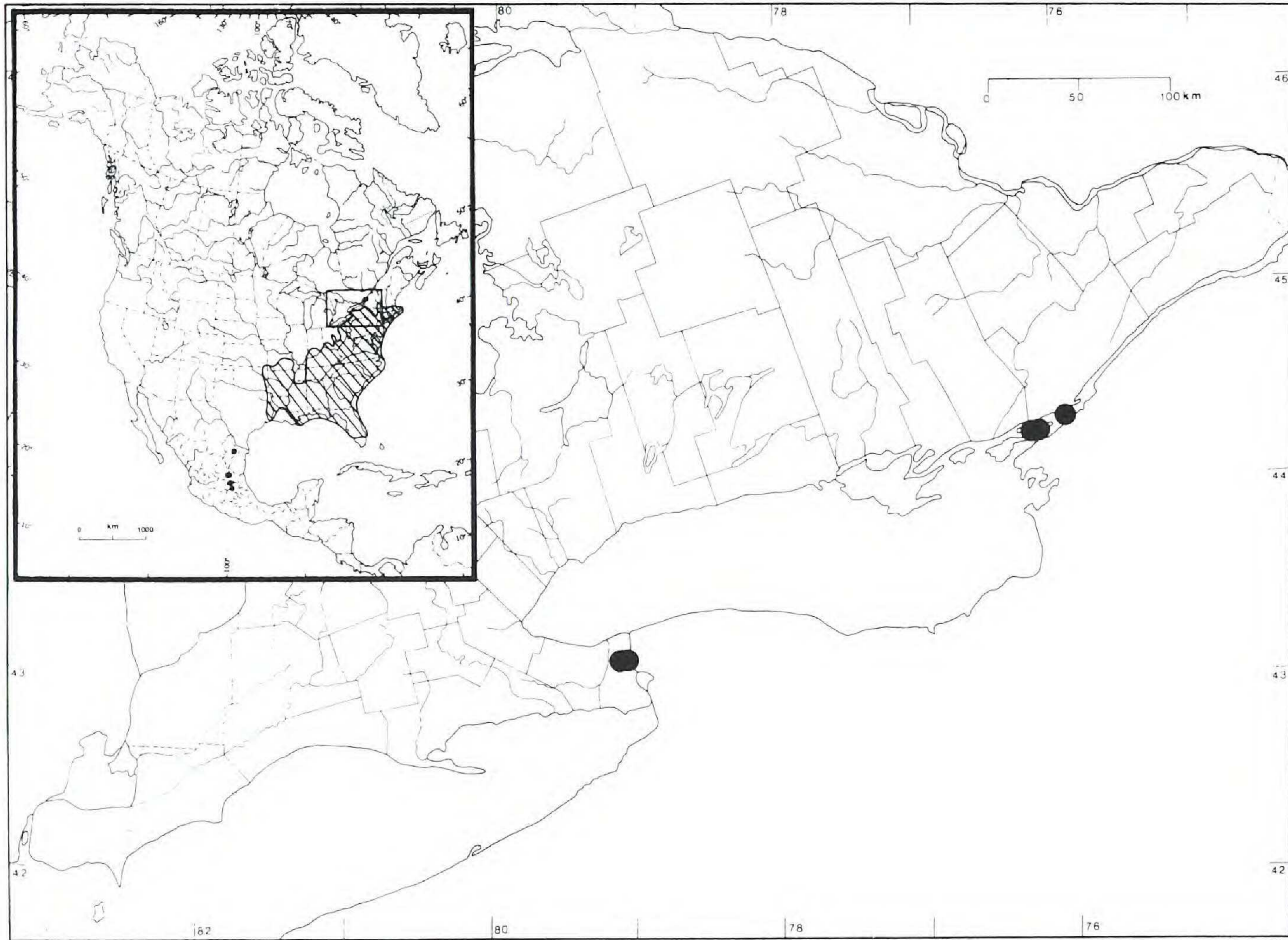


Figure 1. Distribution of *Vaccinium stamineum* in North America and Ontario. North American map after Vander Kloet (1988). Rectangle on North American map indicates location of detail.

Table 1. Site locations, representative specimens, and clump sizes for extant populations of *Vaccinium stamineum* in Ontario. The term clump is defined as a discrete group of stems. A clump may or may not represent more than one individual. Clump numbers and sizes for Leeds County populations are those documented in an unpublished study by St. Lawrence Islands National Park.

Location	Clump #	Clump Size (m)
Regional Municipality of Niagara, City of Niagara Falls, Whirlpool. Representative specimens: <i>Eckel 8604088</i> (BUF); <i>Scott s.n.</i> (DAO, TRT)	1.	<1.0 × 1.0
Regional Municipality of Niagara, City of Niagara Falls, Bruce Trail near Mewburn Road. Representative specimen: <i>Hardy &amp; DeBus s.n.</i> (BUF).	1.	<1.0 × 1.0
Leeds County, Front of Escott Twp., West end of Grenadier Island, St. Lawrence Islands National Park. Representative specimens: <i>Cody &amp; Munro 21779</i> (DAO, TRT); <i>Cody &amp; Munro 22740</i> (DAO); <i>Munro s.n.</i> (DAO); <i>Dore et al. 25122</i> (DAO); <i>Woods &amp; Woods s.n.</i> (CAN).	1.	1.6 × 1.6
	2.	1.2 × 1.2
	3.	1.0 × 0.6
	4.	2.4 × 2.5
	5.	1.4 × 1.4
	6.	1.4 × 1.5
	7a.	1.6 × 3.8
	7b.	3.2 × 3.0
	8.	1.0 × 1.0
	9.	1.0 × 1.0
Leeds County, Front of Leeds and Landsdowne Twp., Endymion Island, St. Lawrence Islands National Park. Representative specimens: <i>Ford s.n.</i> (TRTE) (2 sheets). (see Ford (1984) for further details on this population)	1.	3.5 × 3.5
	2.	3.0 × 3.5
Leeds County, Front of Leeds and Landsdowne Twp., Deathdealer Island. Representative specimen: <i>Chamberlin s.n.</i> (CAN).	1.	1.8 × 2.5
	2.	3.0 × 2.3

they do occur in these extreme conditions, plants often appear sickly with chlorotic and/or wilted leaves. In the Thousand Islands, populations are associated with a variety of tree and shrub species such as: *Amelanchier* Medic. sp., *Carya ovata* (Mill.) K. Koch, *Pinus rigida* Mill., *P. strobus* L., *Prunus serotina* Ehrh., *Quercus alba* L., *Q. rubra* L., *Lonicera dioica* L., *Rubus strigosus* Michx., *Vaccinium angustifolium* Ait., *V. pallidum* Ait., and *Viburnum rafinesquianum* Schultes. In many instances these species appear to be encroaching upon *V. stamineum*. The Niagara Falls populations are associated with *Quercus* L., *Fraxinus* L., and *Crataegus* L. spp.

A number of provincially rare plants occur near stations of *V. stamineum* in the Thousand Islands (Argus et al., 1982–1987). On Endymion Island, *Pinus rigida* Mill., *Vulpia octoflora* (Walt.) Rydb., and *Solidago arguta* Ait. are known to occur (Geomatics International Inc., 1992). *Pinus rigida*, *Solidago arguta*, and *Solidago puberula* Nutt. have been recorded from Grenadier Island (Geomatics International Inc., 1992).

Populations grow on both granite-gneiss and limestone substrates; the former in the Thousand Islands area, the latter in the Niagara region. Soils are usually sandy with a low organic content. In the Thousand Islands, soils are acidic with a pH of 3.4–5.9 with low levels of exchangeable cations such as calcium and magnesium. Organic carbon and soil moisture are also low. Leaf litter is present to a depth of 13 cm and soil depths range from 0–61 cm (Crowder, 1982a, 1982b). Plants are found on both steep slopes (to ca. 45° and usually south-facing) and on flat ground, with all sites being well drained (Crowder, 1982a, 1982b; Ford, unpubl. data). The soil characteristics of the Niagara population are unknown. In the United States, deerberry grows in similar soil conditions but is also known to frequent moist thickets, low woods, and hammocks (Crowder, 1982a; Ward, 1974).

*Vaccinium stamineum* is a species often associated with burnt sites (Crowder, 1982a, 1982b). This is certainly the case in the Thousand Islands area where deerberry is associated with a number of fire-tolerant species such as *Pinus rigida* and *Vaccinium angustifolium*. The fire history of the Niagara stations is unknown.

#### GENERAL BIOLOGY

In Canada, most plants flower between the end of May and the end of June. Flowers are protandrous, the pollen being ready for dispersal a day or two before the stigma becomes receptive. In *V. stamineum*, the pendant nature of the flowers causes the pollen to be shed downwards, making autogamy unlikely. Fruit set requires floral visitation by insects, such as bees, that collect pollen by sonication of the anthers (“buzz-pollination”) (Cane et al., 1985). Over 30 species of bees have been recorded visiting deerberry; however, most are either infrequent visitors or are nectar-seeking and thus insignificant pollen vectors (Cane et al., 1985). One species, *Melitta americana* Smith (Melittidae), however, has been found to be abundant on flowering deerberry bushes in cen-

tral New York and may be the primary pollinator of deerberry throughout its range. Cane et al. (1985) observed female *M. americana* sonicating deerberry anthers while taking in nectar and carrying pure deerberry pollen loads, unlike another common visitor *Xylocopa virginica* (L.) (Anthophoridae). Crowder (1982b) found "adequate numbers of pollinators" at the Grenadier Island station but it is not known whether *M. americana* was the primary pollen vector at this site.

Vegetative reproduction is well developed in blueberries with many species producing rhizomes. When disturbed, these rhizomes often sucker producing either clumps or colonies (Baker, 1970). Later, the tissues connected with the parent plant break down leaving the branch as an established younger plant (Baker, 1970; Crowder, 1982a).

#### POPULATION SIZE AND TRENDS

Like other blueberries, *V. stamineum* is known to spread vegetatively making it difficult to determine how many individuals make up a population. Most populations are characterized by discrete clumps (Table 1). The greatest size and number of clumps are found on Grenadier and Endymion Islands, Leeds County (Table 1). Clumps at these sites may have arisen through the fragmentation of a single individual or may represent different genotypes.

Most deerberry stations in Canada occur next to well-used trails and there is evidence that trail use is having a negative impact on some populations. For example, the Mewburn Road station occurs adjacent to the Bruce Trail and has been impacted by hikers as well as routine trail maintenance (Meyers, 1985, pers. comm.). Both the Grenadier and Endymion Island stations are found next to well-used paths. The fragmented nature of the deerberry populations on these islands may be the result of trampling.

Deerberry appears to produce abundant seeds in the Thousand Islands area, although seedlings are not produced (Crowder, 1982a). The frequent association of deerberry with known fire-tolerant species indicates that deerberry may require post-fire conditions to germinate. In the Thousand Islands area, conditions may have been more favorable for seed germination before the turn of the century when deforestation and fires were more frequent (Crowder, 1982b).

Climate may also be a factor affecting seedling growth. In a study of *V. angustifolium*, Vander Kloet (1976) discovered that seedling establishment is unlikely except under the following sequence of events: 1) a cool, wet spring; 2) a wet August and September; and 3) a mild winter or winter with good snow cover. This sequence of events had not occurred in eastern Ontario in 40 years. Similar climatic conditions may be required for seedling establishment in *V. stamineum*.

#### SPECIAL SIGNIFICANCE OF THE SPECIES

Only three members of the genus *Vaccinium* are used widely in the agricultural industry: *Vaccinium macrocarpon* Ait., *V. corymbosum* L., and *V. angustifolium*. *Vaccinium stamineum* is usually considered to be unpalatable, although certain shrubs can yield delicious fruit. In the southern Appalachians, deerberry is used for pies, jams, and jellies (Ballinger et al., 1981; Strausbaugh and Core, 1958; Stupka, 1964). Indeed, early authors state that deerberry has horticultural potential because of its large fruit, upland adaptation, and drought tolerance. The shrub is sometimes cultivated as an ornamental (Crowder, 1982a).

#### PROTECTION

Although it is considered a threatened species in Canada, deerberry has no legal protection (Ford, 1993). In the United States, deerberry is regarded as a "G5T5 species" by the Nature Conservancy which means that it is "abundant and demonstrably secure." The status in selected states is as follows: Illinois, SH (historical occurrence not having been verified since the turn of the century); Kansas, S1 (critically imperiled); Missouri, SX (apparently extirpated without expectation that it will be rediscovered) (Argus and Pryer, 1990). The status of deerberry in Mexico is unknown but it is locally common in pine forests and is perhaps under collected (Vander Kloet, pers. comm.).

#### EVALUATION OF STATUS

*Vaccinium stamineum* is found at five stations in Ontario. Populations in the Niagara Region are extremely small and threatened with imminent extirpation. In the Thousand Islands area, two

key populations are found within St. Lawrence Islands National Park. Despite the protected status of this plant in the park, the proximity of populations to existing trails, lack of seedlings, and encroachment by later successional vegetation suggests that this species could decline if not actively managed.

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